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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,685	09/30/2004	Greg A. Hanlon	PES-0220	5684

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EXAMINER	
LEE, CYNTHIA K	

ART UNIT	PAPER NUMBER
1745	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/711,685	HANLON ET AL.	
	Examiner	Art Unit	
	Cynthia Lee	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23 and 26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23 and 26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/27/2007 has been entered.

Response to Amendment

This Office Action is responsive to the amendment filed on 3/27/2007. Claims 1-23 and 26 are pending. Claims 1, 13, and 20 have been amended. Claim 26 has been added.

The 35 USC 112, 1st paragraph rejections have been withdrawn.

Applicant's arguments have been considered, but are persuasive. Claims 1-23 and 26 are rejected for reasons stated herein below.

Claims Analysis

The examiner has interpreted the term "through channel" to mean "the presence of a slot or a hole that is made in the respective part (layer)" as disclosed in the specification (para. 28).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 8-13,17-23 and 26 are rejected under 35 U.S.C. 103(a) as obvious over Spear (US 6051331) in view of Lehman (US 5879826).

Spear discloses a bipolar plate made of several layers. A bipolar plate comprises an anode flow field spacer platelet (first layer) (30-2), a cathode flow field spacer platelet (second layer) (30-6), and a cooling platelet (third layer) (30-4). The anode flow field spacer platelet and the cathode flow field spacer platelet have through-etched channels (10:50-65). The layers are bonded to each other (1:16 and 17:30-55). See Fig. 4. Thus, the bonding of the layers creates a bond line between each layer (applicant's claims 1, 13, and 20).

The first layer has a first plurality of channels oriented horizontally (Fig. 6A and 6B) and vertically. The second layer has a second plurality of channels oriented horizontally (Fig. 10A and 10B) and vertically. Thus, they are oriented 90 degrees from each other. An alternating arrangement of the MEA and bipolar plate comprise a fuel cell (claims 13 and 20).

The third layer has channels 18A and 78 (Fig. 8A) that are in fluid communication with the plurality of channels (12:15-67). Further, there are inlet (12 and 16) and outlet ports (18 and 34, Fig. 5) in fluid communication with the header channels (12, 16, 18A and 78, see fig. 8A). The header channels extend over an opposing end of the plurality of channels (applicant's claim 23). The inlets and outlets are diagonal from each other (applicant's claim 3).

The third layer necessarily prevents fluid communication between the first plurality and second plurality of channels because the reactant gases in the first plurality and second plurality of channels do not mix (claims 1, 13, and 20).

The plates are made from bonded titanium or stainless steel (1:10-20) (applicant's claim 12 and 22).

Spear discloses that each platelet is diffusion bonded to each other (17:30-55). Spear discloses that the channels are through-etched (10:50-65). The anode flow field spacer platelet 30-2 is bonded to the cooling plate 30-4 via anode flow field platelet 30-3. When the anode flow field spacer platelet bonds to the anode flow field platelet, the regions encompassing the active area 25, humidification areas 35 and 40 and gas manifolds must necessarily bond. The bonding between anode flow field spacer platelet 30-2 and cooling plate 30-4 occurs on anode flow field platelet 30-3 and thus, the metallic seal comprises material from the first layer and the third layer.

Spear discloses a metallic seal but does not disclose the specifics of the bond line of the metallic seal. Particularly, Spear does not disclose that the first, second, third bond lines partially extends around the channels, first inlet port, and second inlet port, respectively. However, Lehman teaches a bipolar plate in which a gasket seal partially extends around the channels and the inlet and outlet ports (see fig 4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to seal partially around the gas channels and the inlet and outlet port for the purpose of connecting the inlet and outlet ports with the gas channels. Should the inlet port, outlet

port, and gas channels be completely be sealed, the inlet port would be completely isolated from the outlet port, rendering the bipolar plate inoperable.

Claims 4, 5, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spear (US 6051331) in view of Lehman (US 5879826) as applied to claims 1 and 13, and further in view of Wilson (US 2004/0197630).

Spear modified by Lehman teaches that each plate is about 20 mils thick (5:50).

Spear modified by Lehman does not disclose the dimensions of the channels. However, Wilson discloses a bipolar plate with a channel width of 0.8 mm and depth of 0.25 mm (0031; 0033, lines 5-6), thus clearly teaching that the groove dimensions are result effective variables. It has been held by the courts that discovering an optimum value or workable ranges of a result-effective variable involves only routine skill in the art, and thus not novel. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the grooves on Spear's bipolar plates modified by Lehman with the groove dimensions for the purposes of fine tuning the pressure drop of the reactant gases and improving the overall performance of the plate, as taught by Wilson (0031 lines 4-6; 0032 lines 5-8).

Claims 6, 7, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spear (US 6051331) modified by Lehman (US 5879826) as applied to claims 4,5, and 14, and further in view of Toshihiro (JP 05-251097).

Spear modified by Lehman does not teach that the first width is greater than the second width. Toshihiro discloses a bipolar plate wherein the plate comprises grooves of different lengths, in which an upstream portion of a first side of the plate has one width and a downstream portion of the first side has a second width (fig. 1). This configuration was designed by Toshihiro so that the stay of condensed water in the gas channel grooves in the bipolar plate can be eliminated to eject the water quickly (abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Spear's grooves modified by Lehman with two of Toshihiro's bipolar plate facing back to back of each other wherein the larger width of the two widths on the first side is greater than the smaller width on the second side. The motivation would be for the purpose of improving condensed water elimination, as taught by Toshihiro.

Spear teaches that the MEA comprises an oxygen electrode and a hydrogen electrode and the first layer of the bipolar plate is proximate the oxygen electrode (see 5A in Fig. 1).

Response to Arguments

Applicant's arguments filed 3/27/2007 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ckl

Cynthia Lee

Patent Examiner

Susy Tsang-Foster
Supervisory Patent Examiner